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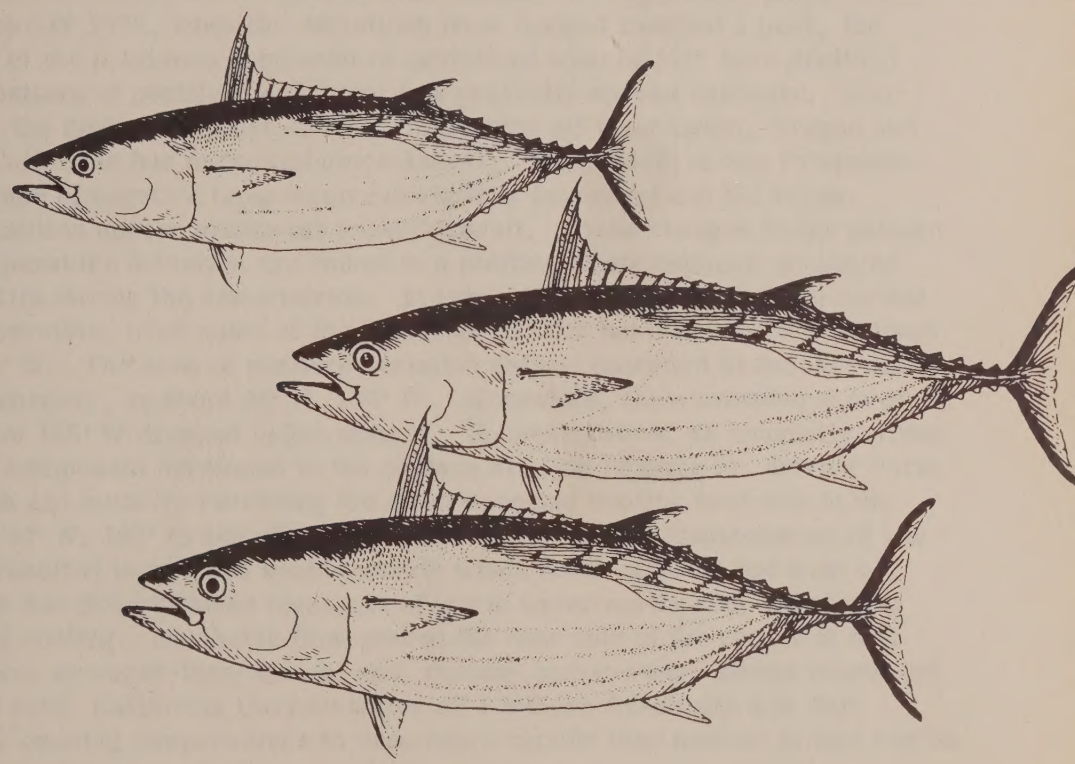
FEBRUARY 1971

FISHING INFORMATION

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



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NARRATIVE DESCRIPTION OF OCEAN TEMPERATURE CONDITIONS

Northeastern Pacific

Ocean temperatures continue to be warmer than normal over a large portion of the central and northeast Pacific Ocean (see Figure 3). However, since December 1970, when the deviations from normal reached a peak, the magnitude of the maximum temperature deviations west of 170° have declined while the pattern of positive departures has gradually spread eastward. Concurrently, the region of colder-than-normal water off Washington, Oregon and Northern California has narrowed since January. But, south of San Francisco, the magnitude of negative temperature deviations increased and the below-normal condition spread southwest toward Hawaii. These changes in the pattern of sea temperature deviation are linked to a shifting of atmospheric pressure abnormalities during the same period. In December 1970, higher-than-normal pressure persisted over much of the northeast Pacific but was centered at about 43° N, 155° W. The area of positive deviation shifted eastward in January and south in February, to about 38° N, 135° W. Meanwhile, the atmospheric pressure west of 155° W dropped below normal. In consequence, an unusually strong northward component developed in the surface air flow (Figure 9), driving warm water north and actually reversing the usual seasonal cooling tendency in the vicinity of 40° N, 135° to 140° W. The abnormal southward displacement of low pressure resulted in reduced southwesterly winds north of 30° N and west of 165° W and therefore reduced transport of warm water northward, permitting more rapid cooling. Northerly flow around the east side of the center of high pressure was stronger-than-normal and, through surface wind stress increased the flow of cold, California Current water off Southern California and Baja California, causing temperatures to drop more rapidly than normal in that region.

Evaporation and heat exchange with the surface layer of air also were effective in changing the distribution of temperature deviations, complementing the effects of wind stress. Reduced heat loss and surface cooling, due to less-than-normal evaporation and heat exchange with the air, occurred in a broad zone extending northeastward from Hawaii toward British Columbia. Northwest and southeast of this zone, excess evaporation and heat loss contributed to increasing negative departures of temperature from normal.

Although these short-term temperature changes are significant, they do not mask the large-scale pattern of temperature deviations. In a statistical study based on the charts published in this series from 1957 to 1968, Dr. Klaus Wyrtki, Oceanographer at the University of Hawaii, found that the average

duration of a sea temperature anomaly (condition of being either above or below normal at a particular location) in the North Pacific was 3.1 months. Also, he determined that anomalies of long duration occur more frequently than those of short duration.

Eastern Tropical Pacific

Conditions in the eastern tropical Pacific in February 1971 (Figure 5), exhibited remarkable little change from the previous month. The most prominent feature is still the cold water stretching along the equator which in some places is more than 4° F below normal (Figure 5). Many of the smaller scale features persist also, including the below normal temperatures in the Gulf of Panama, the Costa Rica Dome and the coastal region from Acapulco to Mazatlan. The area of relatively warm water extending southwest from the tip of Baja California has cooled slightly more than normal since January. The only notable exceptions to the trend of persistence occurred in an area south of Hawaii, in which temperature deviations switched from negative to positive, and in the Gulf of Tehuantepec.

Staff, Fishery-Oceanography Program
R. Michael Laurs, Leader

SEA SURFACE TEMPERATURE CHARTS, PACIFIC OCEAN
FEBRUARY 1971

Acknowledgements

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Living Marine Resources Inc., San Diego, California
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National Marine Fisheries Service, Biological Laboratories La Jolla, California; Honolulu, Hawaii; Seattle, Washington
National Weather Service, San Diego, California
National Ocean Survey, Pacific Marine Center, Seattle, Washington
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U.S. Naval Weather Service, Fleet Numerical Weather Central, Monterey, California

Charts

Figure 1. --Mean sea surface temperature, eastern north Pacific Ocean. Squares show temperatures at weather ship stations. Numerals on shore are temperatures at coastal and lightship stations.

Figure 2. --Mean sea surface temperature chart, western north Pacific Ocean.

Figure 3. --Deviation of sea surface temperatures, eastern north Pacific Ocean from long term charts of H. O. 225. Hatched areas are colder in 1971.

Figure 4. --Deviation of sea surface temperatures, eastern north Pacific Ocean from those of February 1970. Hatched areas are colder in 1971.

Figure 5. --Mean sea surface temperature, eastern tropical Pacific Ocean. Numerals on shore are temperatures at coastal stations.

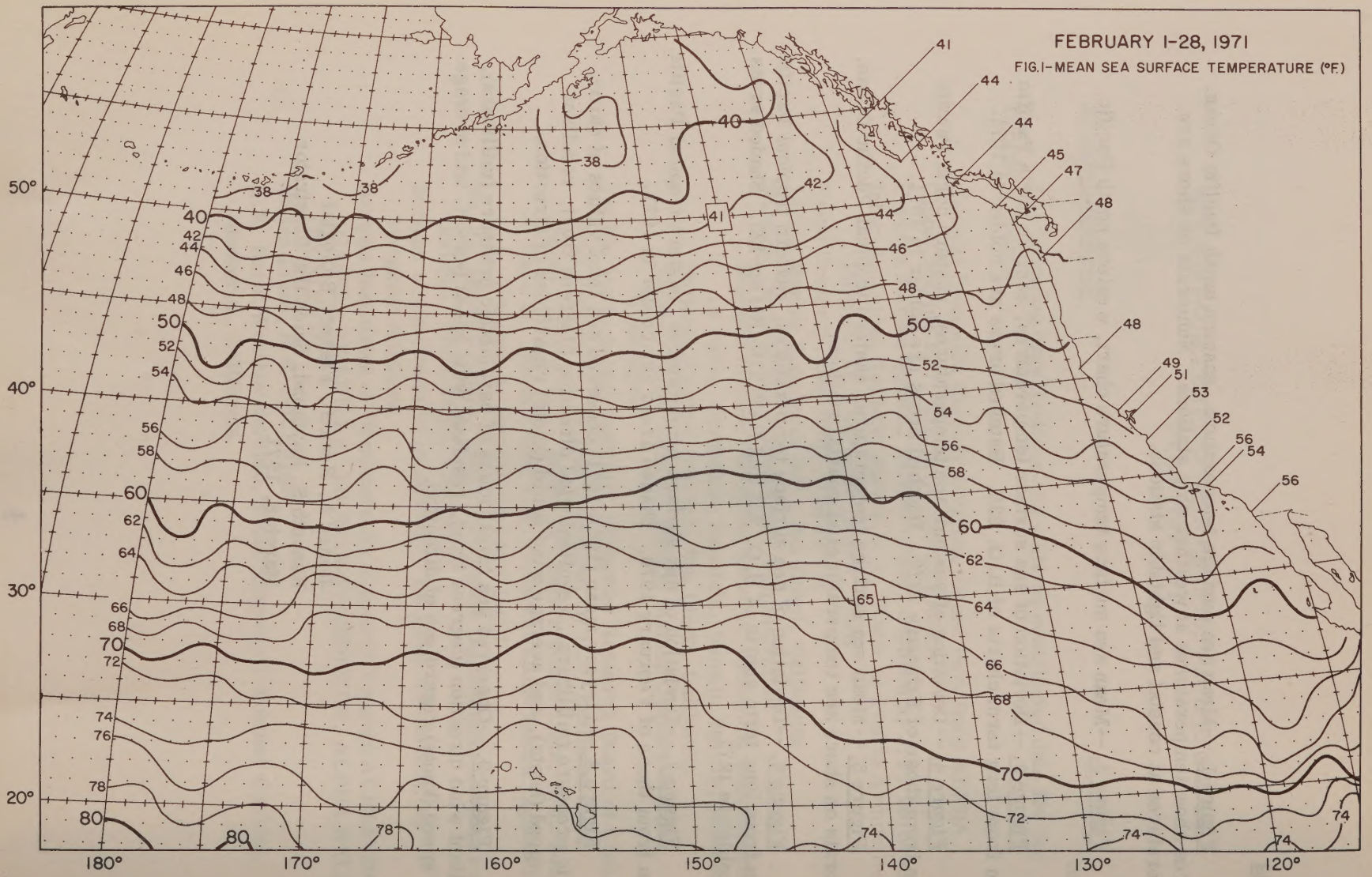
Figure 6. --Deviation of sea surface temperatures, eastern tropical Pacific Ocean from long term charts of H. O. 225 and NAVOCEANO sp-123. Shaded areas are colder in 1971.

Figure 7. --Deviation of sea surface temperatures, eastern tropical Pacific Ocean from those of February 1970. Shaded areas are colder in 1971.

Figure 8. --11-year mean (1961-1971) observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots), and average wind speed (knots) regardless of direction.

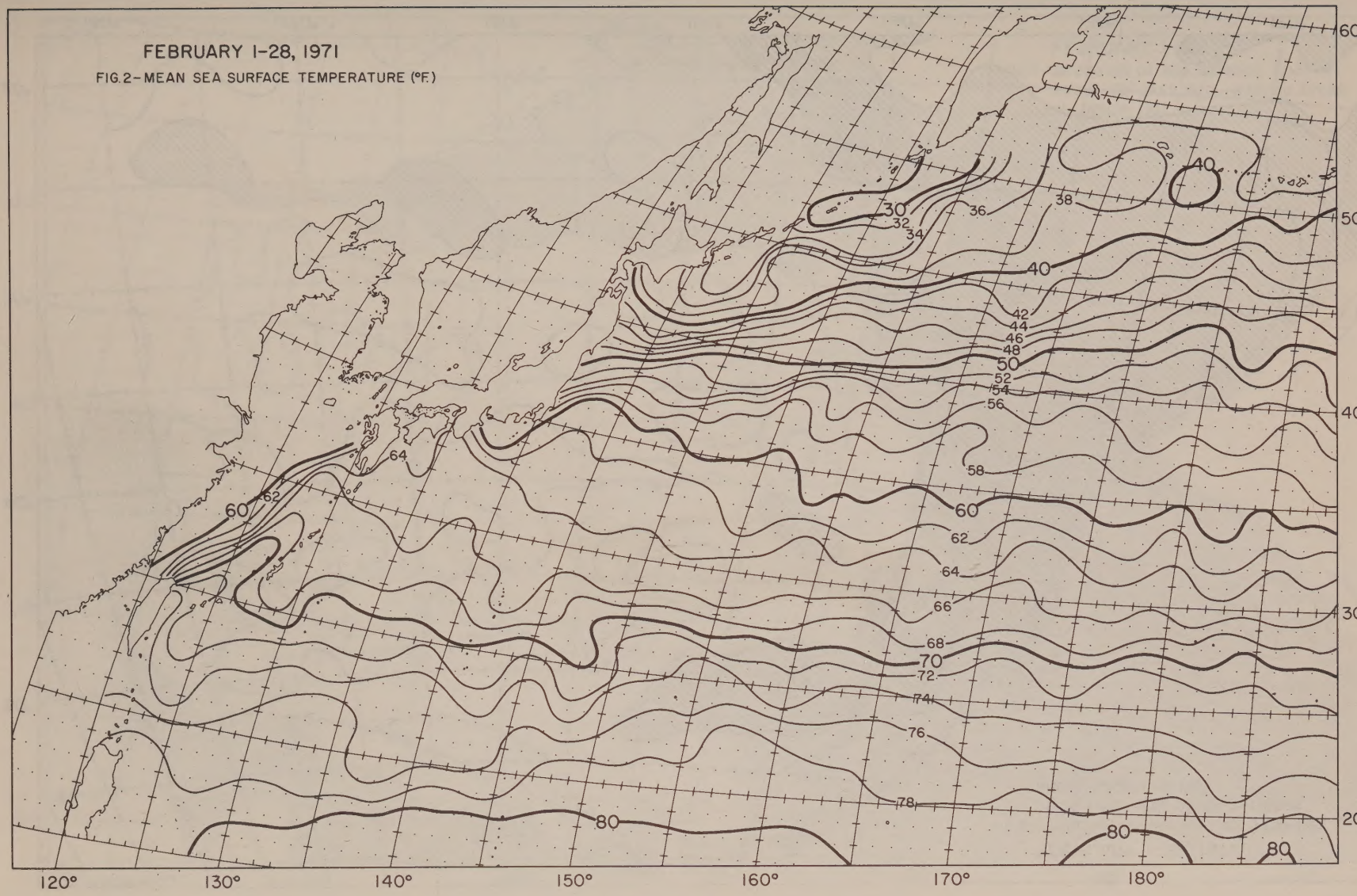
Figure 9. --Observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots), and average wind speed (knots) regardless of direction.

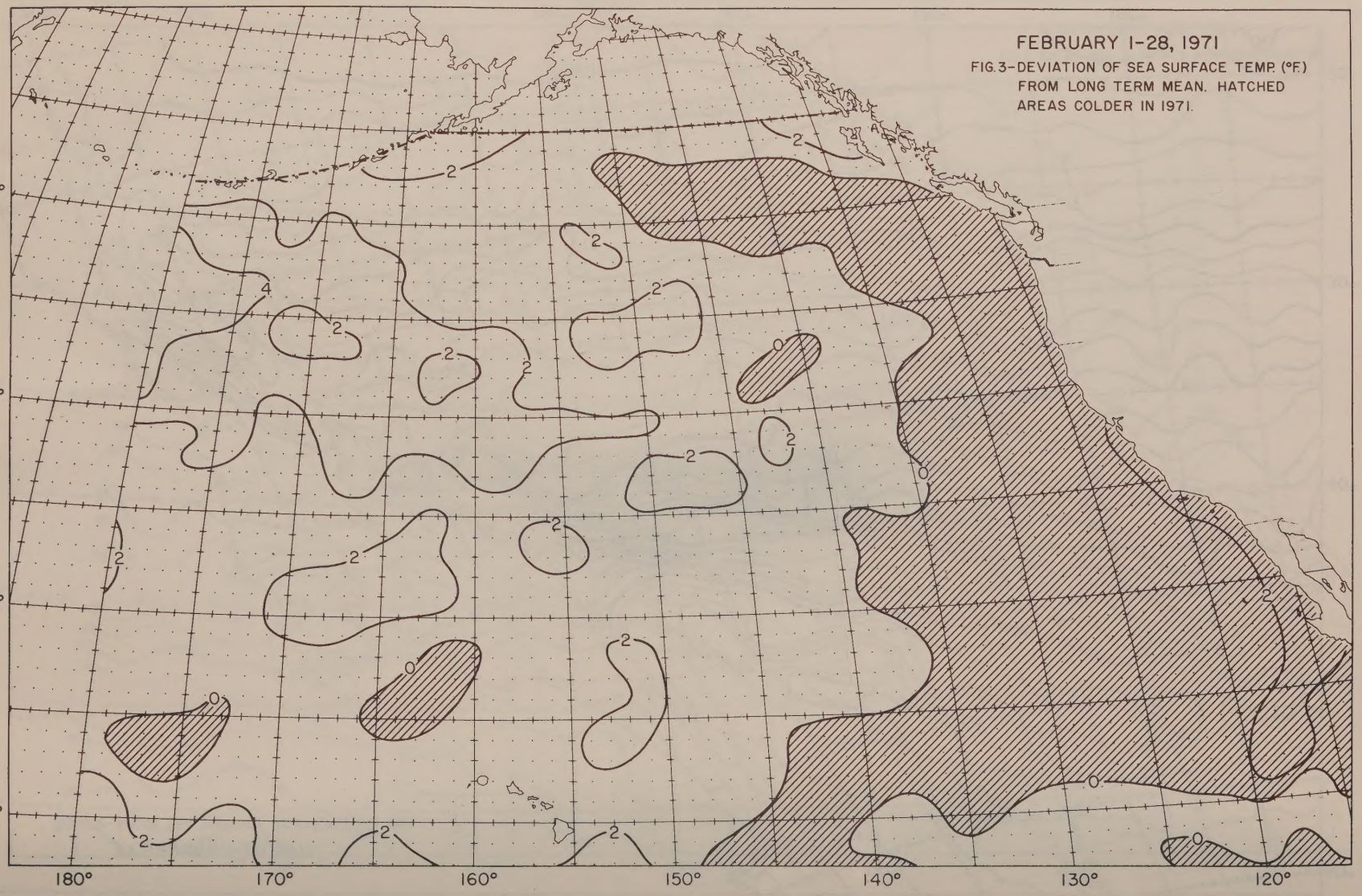
James A. Renner, Fishery Biologist
Kenneth S. Raymond, Scientific Illustrator
March 8, 1971

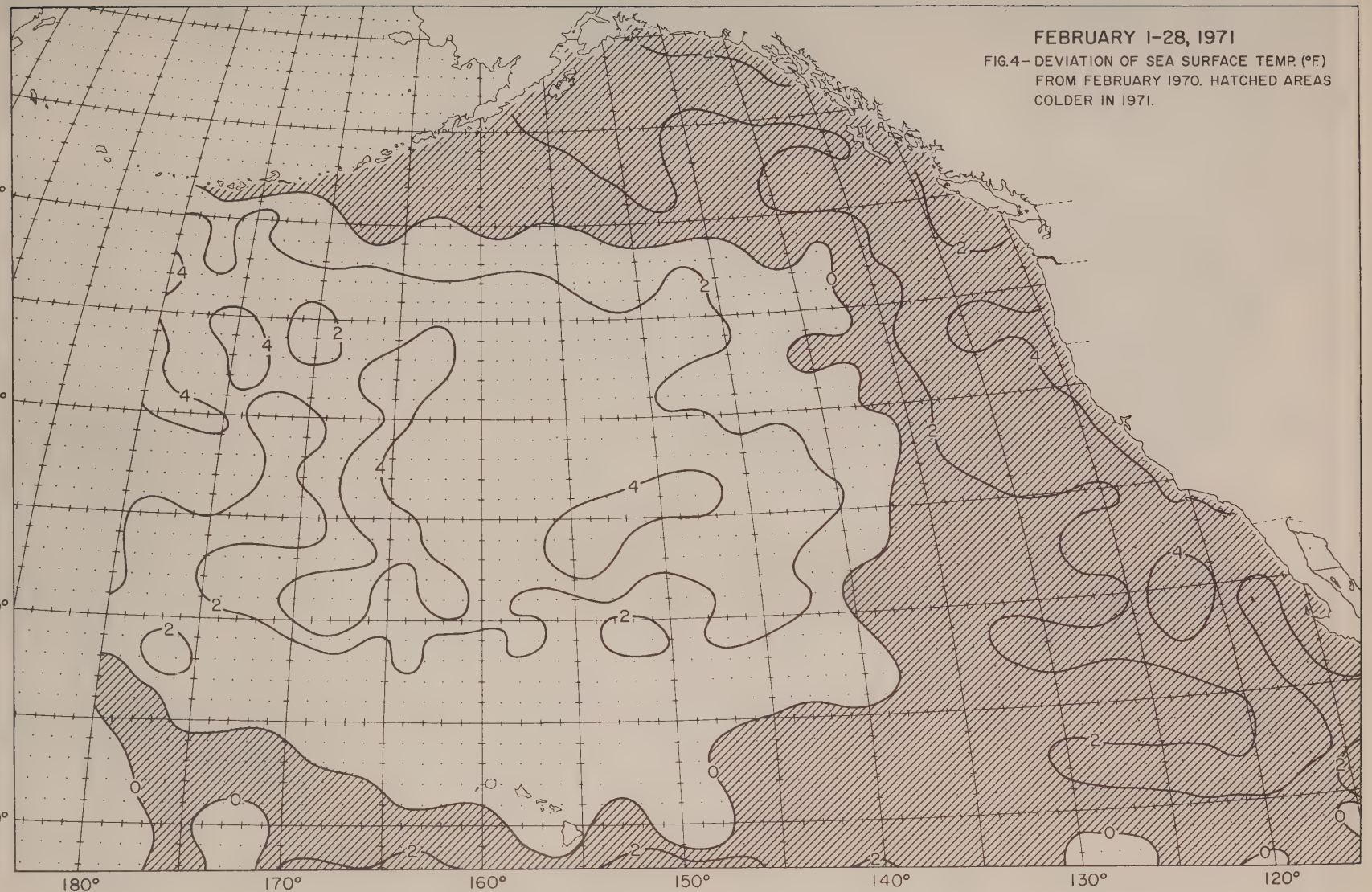

FEBRUARY 1-28, 1971
FIG.1-MEAN SEA SURFACE TEMPERATURE (°F.)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

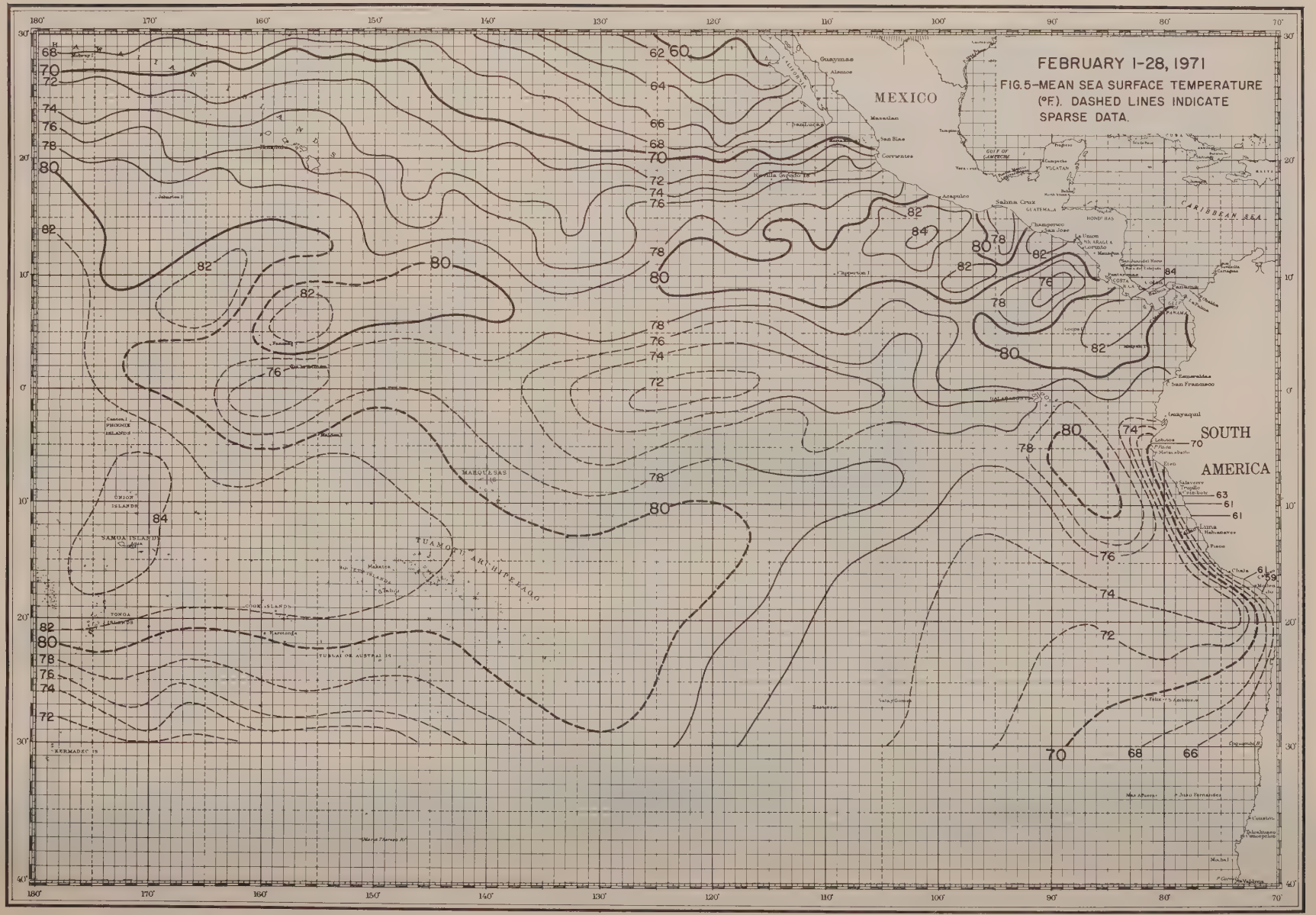
FEBRUARY 1-28, 1971

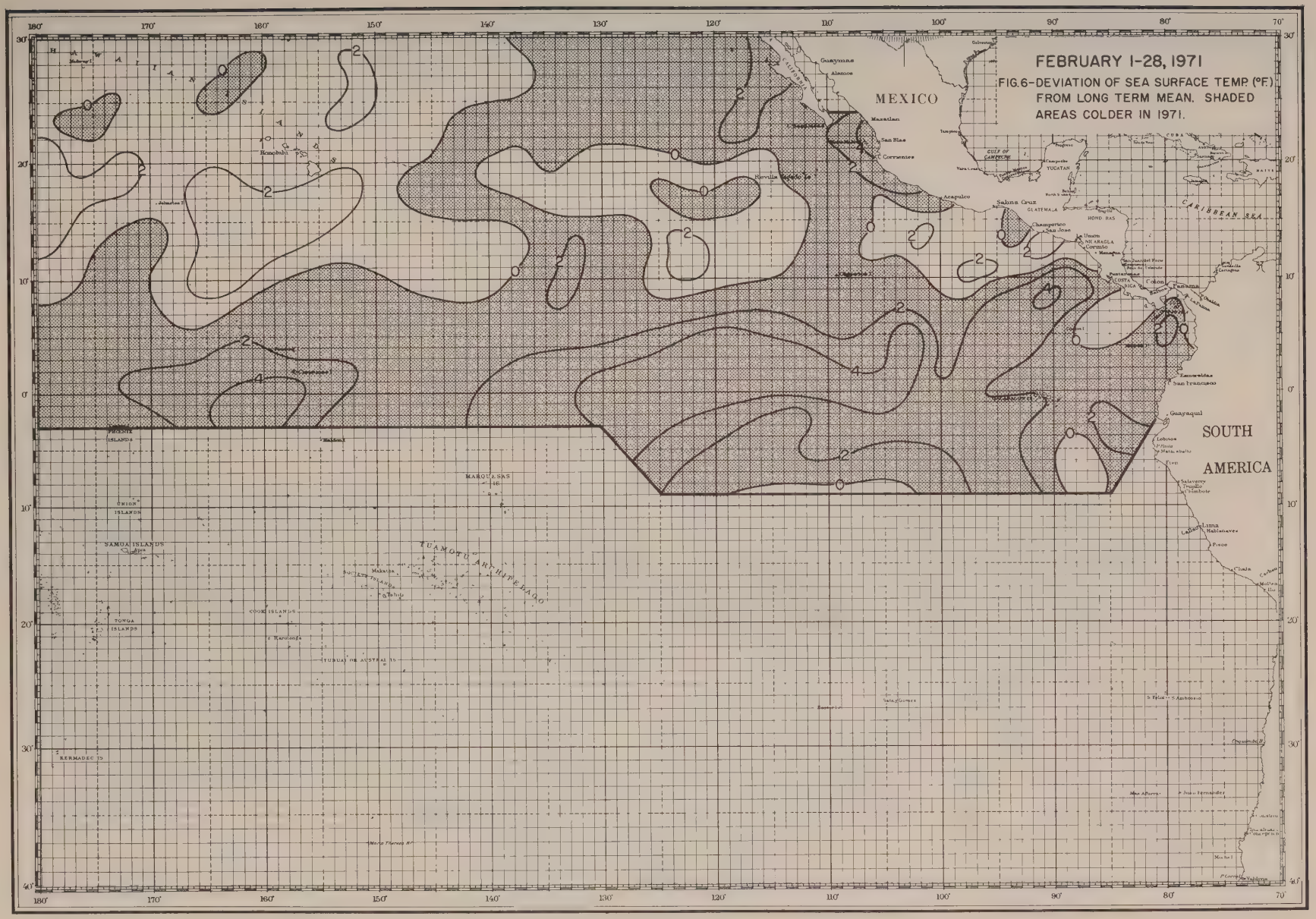
FIG. 2 - MEAN SEA SURFACE TEMPERATURE (°F.)

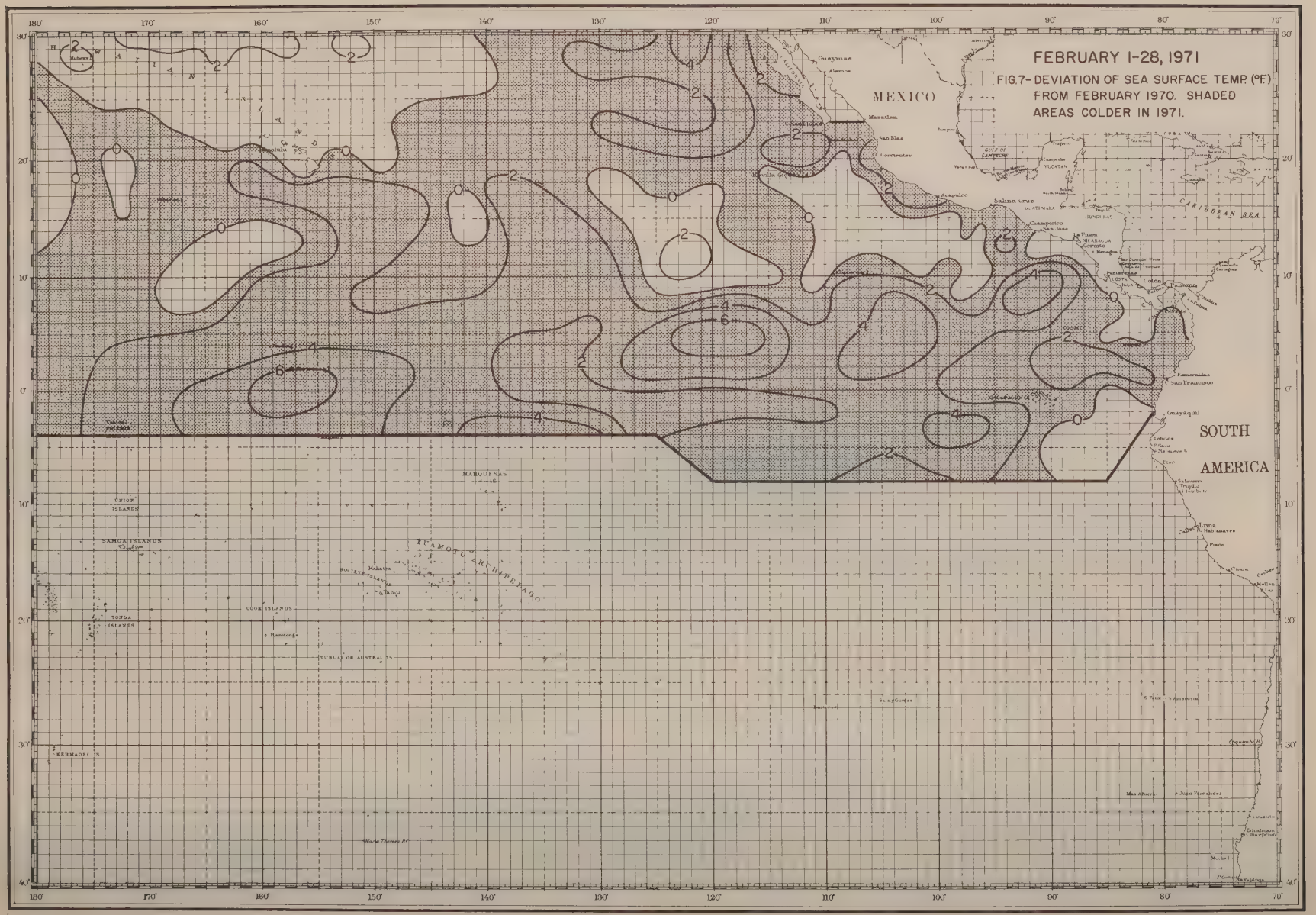



FEBRUARY 1-28, 1971
FIG.3-DEVIATION OF SEA SURFACE TEMP. (°F.) FROM LONG TERM MEAN. HATCHED AREAS COLDER IN 1971.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


FEBRUARY 1-28, 1971
FIG.4- DEVIATION OF SEA SURFACE TEMP. (°F.) FROM FEBRUARY 1970. HATCHED AREAS COLDER IN 1971.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


FEBRUARY 1-28, 1971
FIG. 5—MEAN SEA SURFACE TEMPERATURE (°F). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CALIFORNIA
YUCATAN
Guaymas
Mazatlan
San Blas
Corrientes
Acapulco
Salina Cruz
Tampico
Progreso
Campeche
Veracruz
Guayaquil
Tumaco
Buenaventura
Cali
Popayan
Pasto
Ipiales
Esmeraldas
San Francisco
Panama
Cocos I.
Galapagos Is.
Clipperton I.
Socorro I.
Revilla Gigedo Is.
Johnston I.
Hawaiian Is.
Canton I.
PHOENIX ISLANDS
UNION ISLANDS
SAMOA ISLANDS
TONGA
COOK ISLANDS
TUAMOTU ARCHIPELAGO
MARQUESAS
TUBUAI OR AUSTRAL IS.
KERMADEC IS.
Easter I.
Juan Fernandez
Mocha I.
Valparaiso
Callao
Lima
Chimbote
Salaverry
Trujillo
Pisco
Mollendo
Arica
Iquique
Antofagasta
Coquimbo
Valdivia
Concepcion
Talcahuano
Corral
Puerto Montt
Chiloe
Magellan
Punta Arenas
Cape Horn
Falkland Is.
Buenos Aires
Montevideo
Rio de Janeiro
Santos
Recife
Fernando de Noronha
Trinidad
Tobago
Barbados
Martinique
Guadeloupe
Puerto Rico
Jamaica
Haiti
Cuba
Bahamas
Bermuda
Azores
Canary Is.
Cape Verde Is.
Ascension I.
St. Helena
Tristan da Cunha
Gough I.
Bouvet I.
Marion I.
Prince Edward Is.
Crozet Is.
Kerguelen I.
Heard I.
McDonald Is.
Amsterdam I.
St. Paul I.
Macquarie I.
Auckland Is.
Campbell I.
Antipodes Is.
Bounty Is.
Chatham Is.
Norfolk I.
Lord Howe I.
Kermadec Is.
Fiji Is.
New Caledonia
New Hebrides
Solomon Is.
Gilbert Is.
Marshall Is.
Caroline Is.
Mariana Is.
Wake I.
Midway Is.
Johnston I.
Line Is.
Tuamotu Archipelago
Society Is.
Tuamotu Is.
Austral Is.
Cook Is.
Samoa Is.
Union Is.
Phoenix Is.
Canton I.
Enderbury I.
Christmas I.
Fanning I.
Palmyra I.
Howland I.
Baker I.
Jarvis I.
Tokelau Is.
Ellice Is.
Gilbert Is.
Nauru I.
Ocean I.
Banaba I.
Tarawa
Makin
Apamama
Abemama
Nonouti
Tabiteuea
Beru
Nikunau
Onotoa
Arorae
Tamana
Maiana
Abaiang
Marakei
Butaritari
Kuria
Aranuka
Kuria
Aranuka
Tabiteuea
Beru
Nikunau
Onotoa
Arorae
Tamana
Maiana
Abaiang
Marakei
Butaritari


FEBRUARY 1-28, 1971
FIG.6-DEVIATION OF SEA SURFACE TEMP.(°F.) FROM LONG TERM MEAN. SHADED AREAS COLDER IN 1971.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
HAWAIIAN ISLANDS
Honolulu
Acapulco
Salina Cruz
Guaymas
Mazatlan
San Blas
Corrientes
Manzanillo
Puntarenas
Colon
Panama
Guayaquil
Lobitos
Salaverry
Chimbote
Lima
Callao
Pisco
Chala
Mollendo
Arica
Iquique
Antofagasta
Coquimbo
Valparaiso
MARQUESAS
TUAMOTU ARCHIPELAGO
SAMOA ISLANDS
TONGA ISLANDS
COOK ISLANDS
TUBUAI OR AUSTRAL IS.
PHOENIX ISLANDS
UNION ISLANDS
KERMADEC IS.
Tahiti
Rarotonga
Makatea
Juan Fernandez
Easter I.
Sala y Gomez
Nazca
Mocha
Pisagua
Tocopilla
Mejillones
Caldera
Huasco
Coquimbo
Quintero
Valparaiso
San Antonio
Talcahuano
Concepcion
Corral
Ancud
Melinka
Puerto Montt
Chiloe I.
Guafo I.
Taitao Pen.
Evangelistas
Wellington I.
Tres Montes
Taitao Pen.
Gulf of Penas
Gulf of Corcovado
Gulf of Ancud
Gulf of Arauco
Gulf of Guayaquil
Gulf of Panama
Gulf of Nicoya
Gulf of Fonseca
Gulf of Tehuantepec
Gulf of California
Gulf of Campeche
Yucatan
Cuba
Haiti
Jamaica
Honduras
Guatemala
Nicaragua
Costa Rica
Panama
Galapagos Is.
Clipperton I.
Malpelo I.
Cocos I.
Gorgona I.
Gorgona
Gallo I.
Gallo
Malpelo
Cocos
Clipperton
Galapagos
Easter I.
Juan Fernandez


FEBRUARY 1-28, 1971
FIG.7- DEVIATION OF SEA SURFACE TEMP. (°F) FROM FEBRUARY 1970. SHADED AREAS COLDER IN 1971.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CAMPECHE
YUCATAN
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
COLOMBIA
ECUADOR
PERU
Guaymas
Mazatlan
San Blas
Acapulco
Salina Cruz
Champerico
Corinto
Managua
Puntarenas
Panama
Buenaventura
Tumaco
Esmeraldas
San Francisco
Guayaquil
Salaverry
Trujillo
Lima
Callao
Pisco
Chimbote
Paita
Talara
Pta. Aguja
Pta. Parinas
Pta. Pariñas
Pta. Malpelo

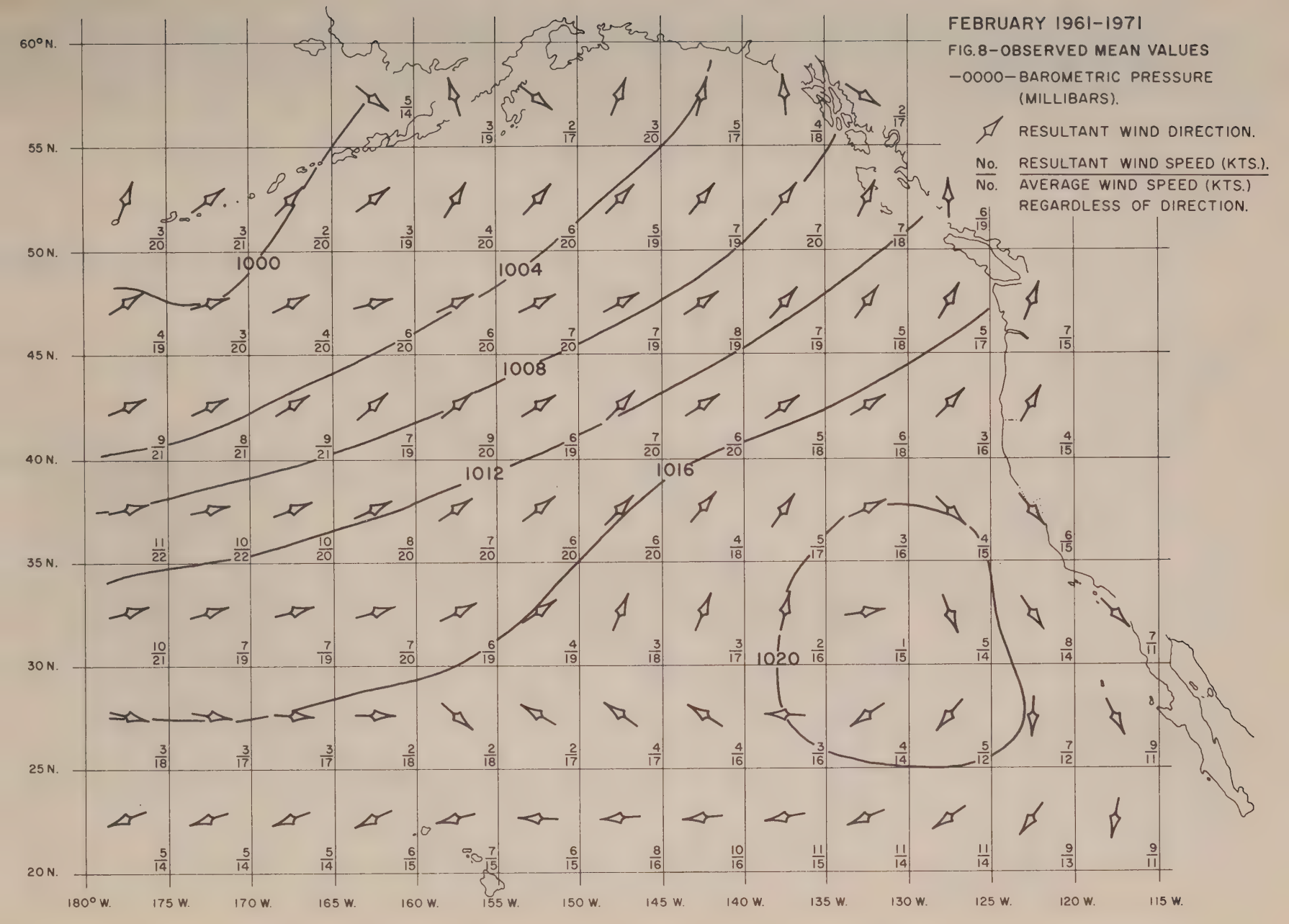

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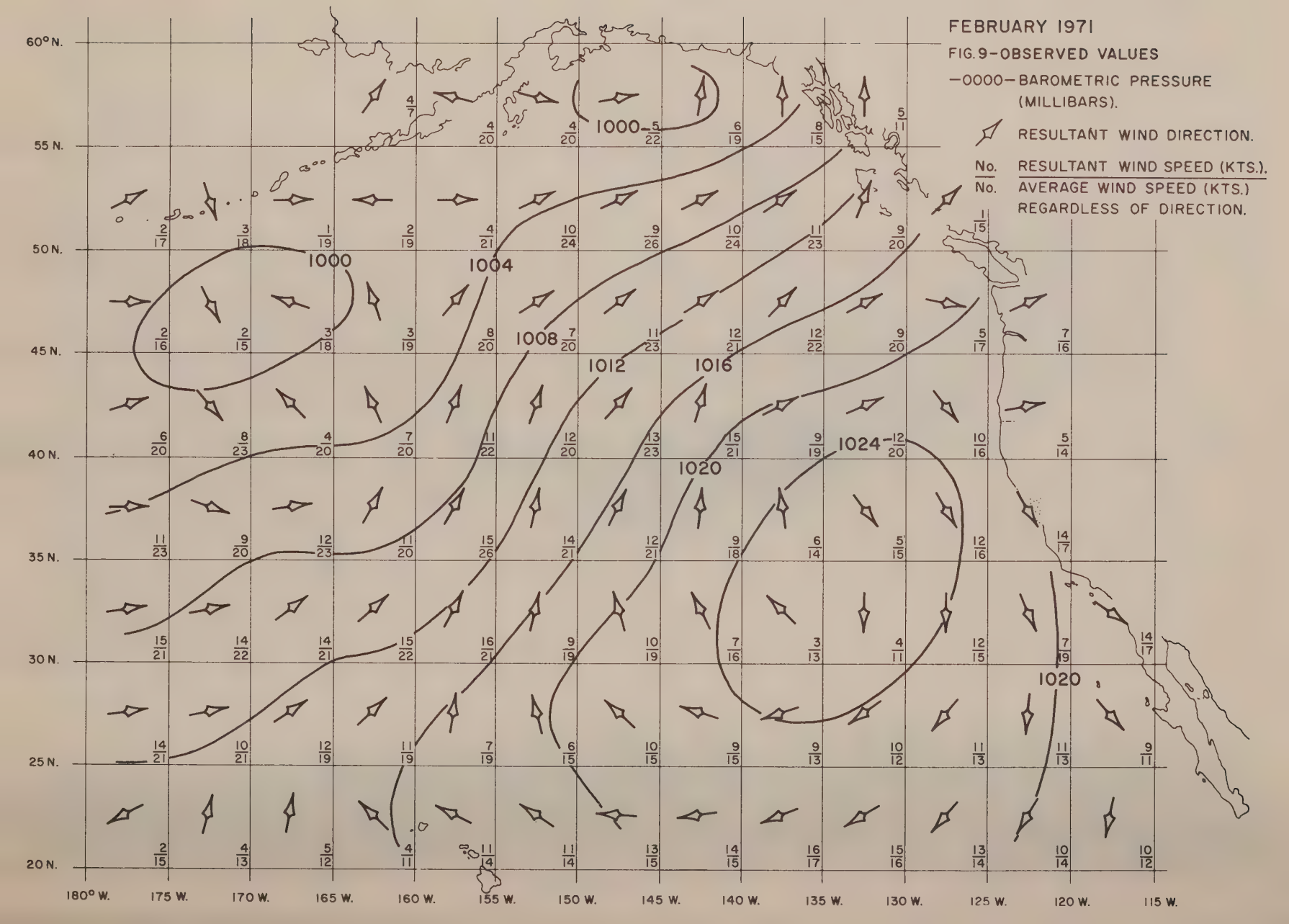
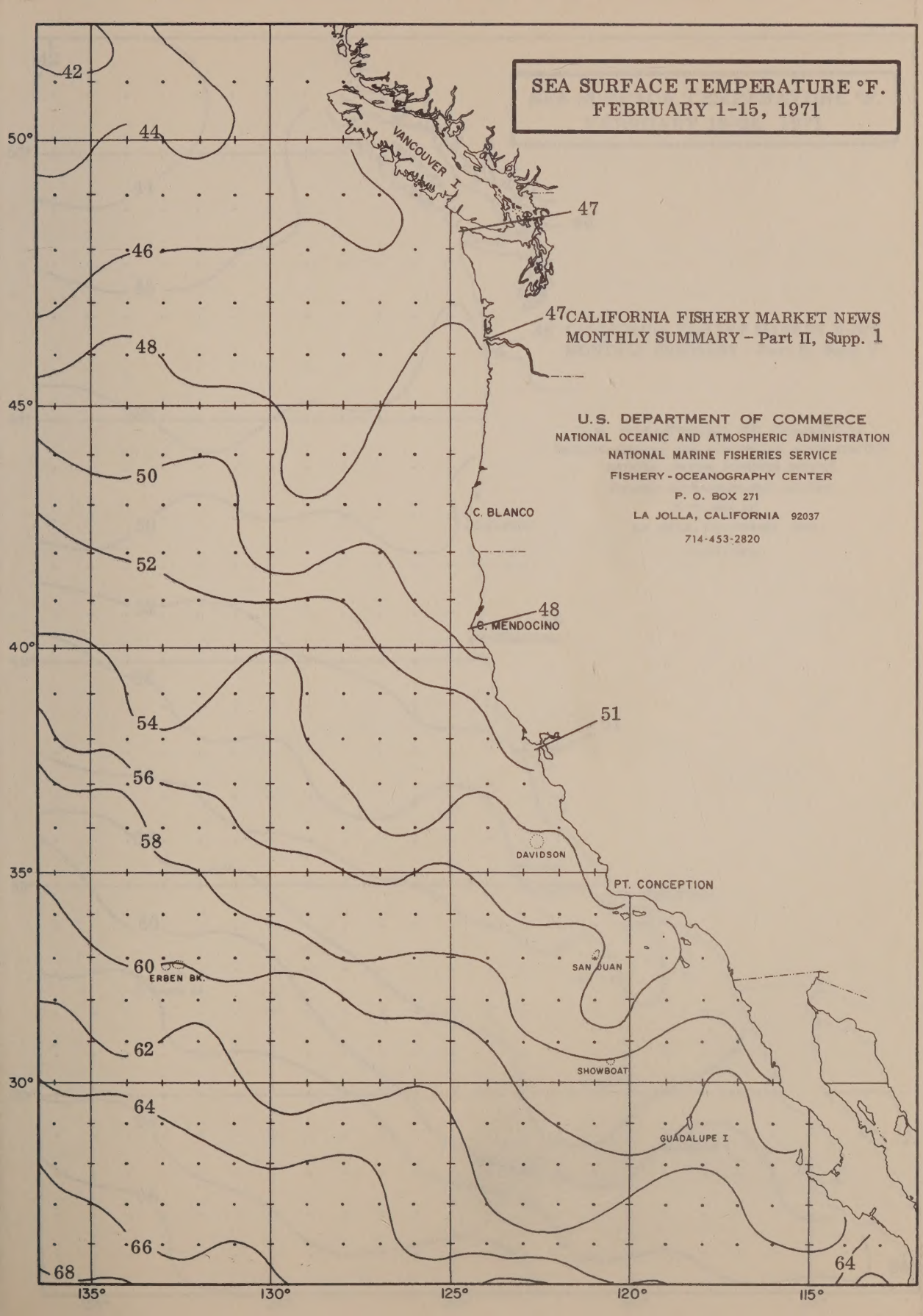
FIG. 8-OBSERVED MEAN VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. / No. RESULTANT WIND SPEED (KTS.) / AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1000
1004
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.


FEBRUARY 1971
FIG. 9-OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.).
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1000
1004
1008
1012
1016
1020
1024
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.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FEBRUARY 1-15, 1971
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C. MENDOCINO
DAVIDSON
PT. CONCEPTION
SAN JUAN
SHOWBOAT
GUADALUPE I
ERBEN BK.
42
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50°
45°
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35°
30°
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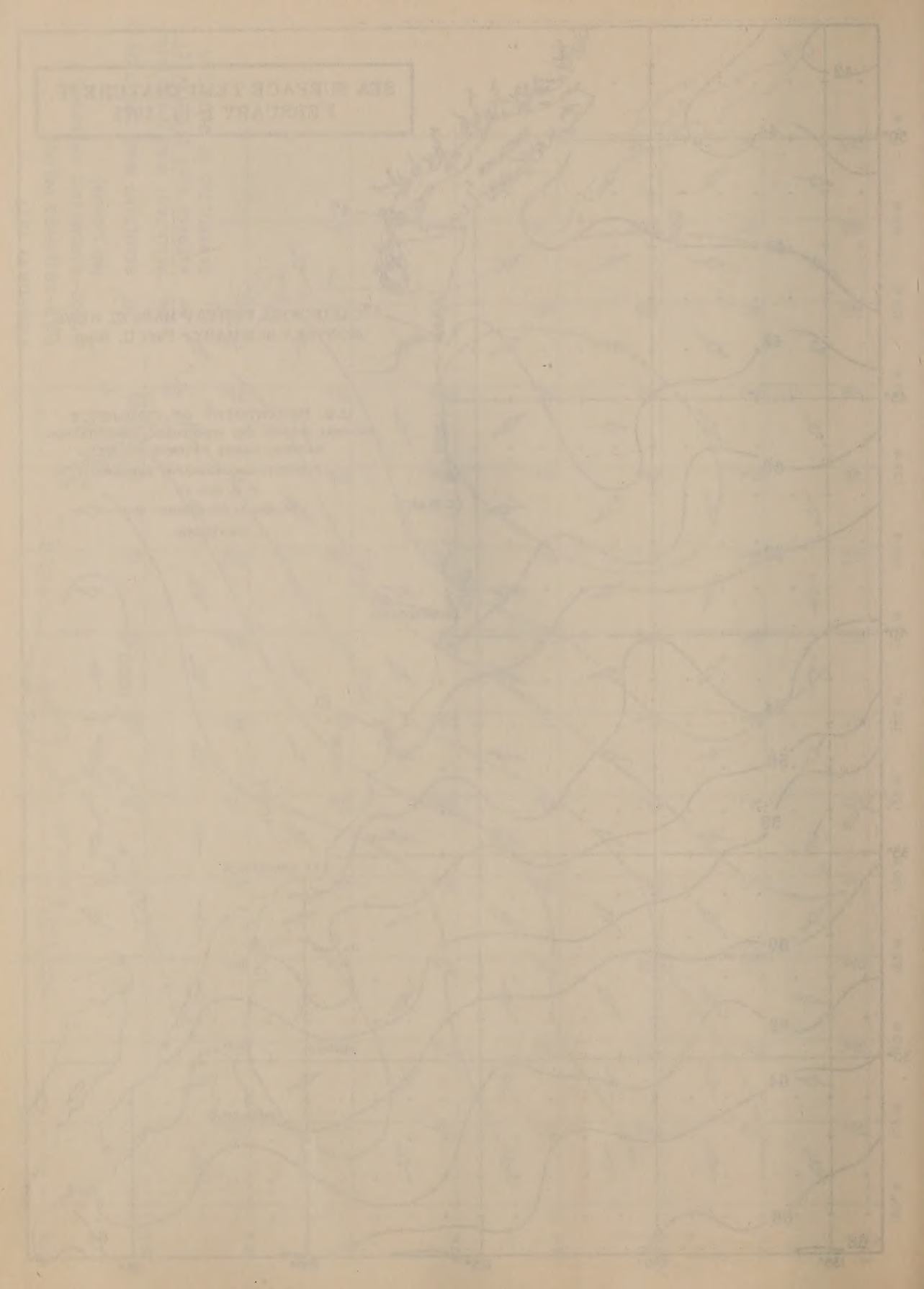
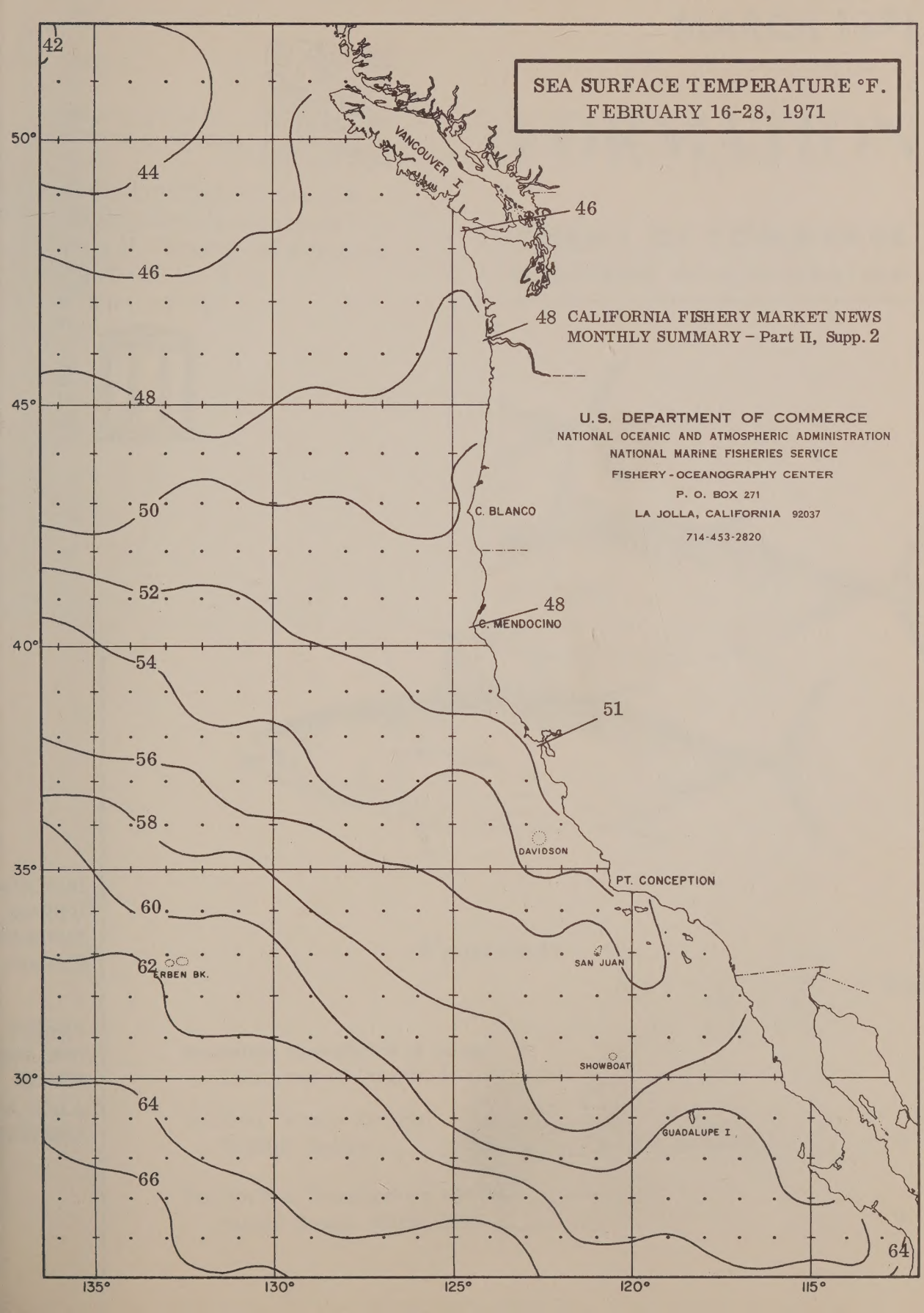
130°
125°
120°
115°




SEA SURFACE TEMPERATURE °F.
FEBRUARY 16-28, 1971
CALIFORNIA FISHERY MARKET NEWS
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GUADALUPE I
ERBEN BK.
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45°
40°
35°
30°
135°
130°
125°
120°
115°